AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of Claims:

1. (Currently Amended) A device ~~Device~~ for producing a radioisotope ~~of interest~~ from a target fluid irradiated with a beam of accelerated charged particles, the ~~said~~ device including ~~comprising in~~ a circulation circuit ~~(17)~~ comprising:

an irradiation cell ~~(1)~~ comprising a metallic insert ~~(2) able to form~~ and a cavity, the cavity effective ~~(8) designed to house~~ for receiving the target fluid ~~and closed by an irradiation window (7), said cavity (8) comprising at least one inlet (4) and at least one outlet (5)~~;

a pump ~~(16)~~ effective for generating flow of the target fluid and circulating the target fluid inside the circulation circuit ~~(17)~~;

an external heat exchanger ~~(15)~~; and

a pressurizing device for pressurizing the circulation circuit,

wherein ~~said~~ the pump ~~(16)~~ and ~~said~~ the external heat exchanger ~~(15) forming~~ form an external cooling device ~~means~~ effective for cooling ~~of~~ the ~~said~~ target fluid [[;]] and configured to retain the target fluid inside the cavity essentially in the liquid state during irradiation.

~~said device being characterized in that it further comprises pressurizing means (14) of said circulation circuit (17) and the external cooling means of said target fluid are arranged in such a way that the target fluid remains inside the cavity (8) essentially in the liquid state during the irradiation.~~

2. (Currently Amended) The device according to claim 1, wherein the ~~said~~ pump ~~(16)~~ generates a flow rate sufficient to keep the target fluid at a mean temperature below 130° C.

3. (Currently Amended) The device according to claim 1 wherein the ~~said~~ pump ~~(16)~~ generates a flow rate greater than 200 ml/minute.

4. (Currently Amended) The device according to claim 3 [[1]], wherein the ~~said~~ pump generates a flow rate greater than 500 ml/minute~~, preferably greater than 1000 ml/minute, and more preferably greater than 1500 ml/minute~~.

5. (Currently Amended) The device according to claim 1, wherein the ~~said~~ cavity ~~(8)~~ is ~~able to~~ configured to contain a volume of target fluid of between 0.2 and 5.0 ml.

6. (Currently Amended) The device according to claim 1, wherein ~~it is configured so as to contain in its circulation circuit (17) an~~ the overall volume of the target fluid in the circulation circuit ~~that~~ is less than 20 ml.

7. (Currently Amended) The device according to claim 1, wherein the irradiation cell further comprises an inlet ~~(4)~~ and outlet ~~(5) are arranged in such a way as~~ to provide inflow and outflow of the target material, wherein the inlet and outlet are configured to create a vortex in the flow of the target fluid inside the ~~said~~ cavity ~~(8)~~.

8. (Currently Amended) The device according to claim 7 [[1]], wherein one of the inlet ~~(4)~~ or the outlet ~~(5)~~ is positioned essentially tangentially to the ~~said~~ cavity ~~(8)~~.

9. (Currently Amended) The device according to claim 11 [[1]], wherein the inlet and the outlet are located at the lateral surface of the cavity ~~(8),~~ on the same meridian.

10. (Currently Amended) The device according to claim 7 [[1]], wherein the irradiation cell further comprises an irradiation window and wherein the inlet ~~(4)~~ is arranged so that the target fluid inflow is directed at a impact point of the accelerated charged particle beam in the ~~cavity~~ irradiation window ~~(7) in such a manner~~ so that the ~~said~~ inflow hits the ~~said~~ window head-on with the ~~said~~ beam.

11. (Currently Amended) The device according to claim 1, wherein the cavity ~~(8) presents~~ has a central axis ~~(x-x)~~ around which a lateral surface is developed, the outlet ~~(5)~~ being connected to the ~~said~~ lateral surface and the inlet ~~(4)~~ being along the ~~said~~ central axis.

12. (Currently Amended) The device according to claim 1, wherein the ~~said~~ irradiation cell ~~(1)~~ further comprises an internal cooling ~~means~~ device effective for cooling the target material.

13. (Currently Amended) The device according to claim 12 [[1]], wherein the ~~said~~ internal cooling ~~means~~ device ~~are in the form of~~ comprises a double-walled jacket surrounding the ~~said~~ cavity ~~(8)~~.

14. (Currently Amended) The device according to claim 12, wherein the ~~said~~ internal cooling ~~means~~ device ~~are~~ provides indirect cooling ~~means~~ of the cavity ~~(8)~~.

15. (Currently Amended) The device according to claim 1~~, wherein it comprises~~ further comprising a Helium-based cooling ~~means~~ device for cooling the irradiation window ~~(7)~~ of the irradiation cell ~~(1)~~.

16–20. (Cancelled)

21. (Currently Amended) A method for manufacturing a radiopharmaceutical compound, the method comprising utilizing ~~Use of~~ the device according to claim 1~~, for manufacturing a radiopharmaceutical compound, in particular devoted to medical applications such as positron emission tomography~~.

22. (New) The device according to claim 3, wherein the pump generates a flow rate greater than 1000 ml/minute.

23. (New) A device for producing a radioisotope from a target fluid irradiated with a beam of accelerated charged particles, the device including a circulation circuit comprising:

an irradiation cell comprising an irradiation window and a metallic insert having a housing including a lateral wall portion and a second wall portion, the housing including at least one inlet and at least one outlet to provide inflow and outflow of the target material, the irradiation window located opposite the second wall portion, and a cavity for receiving the target fluid located between the lateral wall portion, second wall portion, and irradiation window;

a pump for generating flow of the target fluid at a rate greater than 200 ml/minute and circulating the target fluid inside the circulation circuit;

an external heat exchanger; and

a pressurizing device for pressurizing the circulation circuit,

wherein the pump and the external heat exchanger form an external cooling device effective for cooling the target fluid and configured to retain the target fluid inside the cavity essentially in the liquid state during irradiation.

24. (New) The device according to claim 23, wherein the pump generates a flow rate sufficient to keep the target fluid at a mean temperature below 130° C.

25. (New) The device according to claim 23, wherein the pump generates a flow rate greater than 500 ml/minute.

26. (New) The device according to claim 23, wherein the inlet and outlet are configured to create a vortex in the flow of the target fluid inside the cavity.

27. (New) The device according to claim 23, wherein one of the inlet or the outlet is positioned essentially tangentially to the lateral wall portion.

28. (New) The device according to claim 23, wherein the inlet and the outlet are located at the lateral wall portion on the same meridian.

29. (New) The device according to claim 23, wherein the inlet is arranged so that the target fluid inflow is directed at a impact point of the accelerated charged particle beam in the irradiation window so that the inflow hits the window head-on with the beam.

30. (New) The device according to claim 23, wherein the cavity has a central axis extending from the window to the second wall portion, the outlet being connected to the lateral wall portion and the inlet being along the central axis.

31. (New) The device according to claim 23, wherein the irradiation cell further comprises an internal cooling device effective for cooling the target material.